II. PRPOSED AMENDMENTS TO THE CLAIMS

The following listing of proposed claims replaces all prior versions, and listings, of claims in the application.

A. Listing of the Claims

The following listing of claims replaces all prior versions, and listings, of claims in the application. Material to be inserted is in **bold and underline**, and material to be deleted is in ~~strikethrough~~ or (if the deletion is of five or fewer consecutive characters or would be difficult to see in double brackets **[[ ]]**.

1. (Currently amended) An electrodeionization device having an ion concentration compartment, ion depletion compartment, and first and second fluid flow paths that flow parallel between the ion concentration and ion depletion compartments but flow serially within each compartment, the electrodeionization device comprising:

i) an anode ~~assembley~~ **assembly** having one or more of electrode plates;

ii) a cathode ~~assembley~~ **assembly** having one or more of electrode plates; and

iii) a channel grouping, including one or more ion depletion compartments arranged in an alternating sequence with one or more ion concentration compartments, the channel grouping interposed between the anode and cathode assembly wherein each anode and cathode ~~assmbley~~ **assembly** is paired with only one channel grouping,

a) each ion depletion compartment including,

an anode side and a cathode side having an anion permeable membrane attached to the anode side and a cation permeable membrane attached to the cathode side, and a plurality of stacked serially arranged and sequentially linked fluid accessible ion depletion channels which contain an ion exchange material for releasing ions from a fluid passing therethrough when a current is generated between the anode and cathode assemblies,

wherein each ion depletion compartment is configured such that a first portion of a fluid stream flowing into each compartment will sequentially flow into each ion depletion channel, and a second portion of the fluid stream will bypasses each ion depletion channel and travel through a first conduit bypassing any adjacent ion concentration compartments, and

b) each ion concentration compartment including,

an anode side and a cathode side having a cation permeable membrane attached to the anion side and an anion permeable membrane attached to the cation side and, a plurality of stacked serially arranged and sequentially linked fluid accessible ion concentration channels which contain an ion exchange material for migrating ions into a fluid passing therethrough when a current is generated between the anode and cathode assemblies,

wherein each ion concentration compartment is configured such that a first portion of a fluid stream flowing into each compartment will sequentially flow into each ion concentration channel, and a second portion of the fluid stream will bypasses each ion concentration channel and travel through a second conduit bypassing any adjacent ion depletion compartments,

wherein said first fluid flow path configured to introduce fluid into and release fluid from each said ion depletion compartment substantially contemporaneously,

wherein said second fluid flow path configured to introduce fluid into and release fluid from each said ion concentration compartment substantially contemporaneously.

2. (Previously amended) The electrodeionization device of claim 1, wherein said anode assembly and said cathode assembly each comprises three electrode plates.

3. (Previously amended) The electrodeionization device of claim 1, wherein said anode assembly comprises two anode electrode plates; and said cathode assembly comprises two cathode electrode plates.

4. (Previously amended) The electrodeionization device of claim 3, wherein the number of anode electrode plates, cathode electrode plates, and ion depletion channels in each ion depletion compartment, and the number of ion concentration channels in each ion concentration compartment is the same.

5. (Original) The electrodeionization device of claim 4, where said number is three.

6. (Canceled)

7. (Original) The electrodeionization device of claim 3, wherein said anode assembly and said cathode assembly are connected to a single multiple-outlet power supply.

8. (Canceled)

9. (Canceled)

10. (Currently amended) An electrodeionization device for ultrapure electrodeionization of water, having concurrent and parallel flow paths for a product stream and a waste stream wherein the product and waste stream flow paths flow contemporaneously in parallel between product compartments and waste compartments, and flow serially within each individual compartment, the electrodeionization device comprising:
i) a plurality of anode assemblies, each anode assembly includes a plurality of electrode plates;
ii) a plurality of cathode assemblies, each cathode assembly includes a plurality of electrode plates; and
iii) a plurality of channel groupings, including one or more ion depletion product stream compartments arranged in an alternating sequence with one or more ion concentration waste stream compartments, each channel grouping interposed between the anode and cathode assembly wherein each anode and cathode ~~assmbley~~ **assembly** is paired with only one channel grouping,

a) each ion depletion product ~~state~~ **stream** compartment including an anion permeable membrane attached to the anode side and a cation permeable membrane attached to the cathode side, and a plurality of stacked serially arranged and sequentially linked fluid accessible ion depletion product stream channels which contain

an ion exchange material for releasing ions from a fluid passing therethrough when a current is generated between the anode and cathode assemblies, and

b) each ion concentration waste stream compartment including an anode side and a cathode side having a cation permeable membrane attached to the anion side and an anion permeable membrane attached to the cation side and said product stream flow path configured to introduce a product stream into each of the ion depletion product stream compartments by way of a product stream compartment inlet port wherein,

c) a first portion of the product stream enters the product stream accessible channels having a plurality of serially linked ion depletion product channels, wherein ions are released from the product stream passing therethrough when a current is generated between the anode and cathode assemblies, and the product stream is released from each ion depletion product compartments by way of a product stream compartment outlet port, and flows towards the next ion depletion product compartment by way of a first conduit, bypassing the adjacent ion concentration waste compartment by flowing through a first product compartment bypass port, and

d) another portion of the product stream bypasses the product stream accessible channels and flows towards the next ion depletion product compartment by way of a second conduit, bypassing the adjacent ion concentration waste compartment by flowing through a second product compartment bypass port,

said a waste stream flow path configured to introduce a waste stream to each of the ion concentration waste stream compartments by way of a waste stream compartment inlet port wherein,

e) a first portion of the waste stream enters the waste stream accessible channels having a plurality of serially linked ion concentration waste stream channels wherein ions migrate from the waste stream passing therethrough when a current is generated between said anode and cathode assemblies, and the waste stream is released from each ion concentration waste stream compartment by way of an outlet port, and flows towards the next ion concentration waste stream compartment by way of a first conduit, bypassing the adjacent ion depletion product compartment by flowing through a first waste compartment bypass port, and

f) another portion of the waste stream bypasses the waste stream accessible channels and flows towards the next ion concentration waste stream compartment by way of a second conduit, bypassing the adjacent ion depletion product stream compartment by flowing through a second waste compartment bypass port.

11. (Previously amended) The electrodeionization device of claim 10, wherein said anode assembly comprises three anode electrode plates; and said cathode assembly comprises ~~a~~ three cathode electrode plates.

12. (Previously amended) The electrodeionization device of claim 11, wherein

the number of anode electrode plates, cathode electrode plates, and ion depletion channels in each ion depletion compartment, and the number of ion concentration channels in each ion concentration compartment is the same.

13. (Original) The electrodeionization device of claim 12, wherein said number is three.

14. (Original) The electrodeionization device of claim 10, wherein said anode assembly and said cathode assembly are connected to a single multiple-outlet power supply.

15. (Canceled)

16. (Previously amended) An electrodeionization device through which is provided a product flow path and a waste flow path, wherein the product and waste flow paths flow contemporaneously in parallel between ion depletion product compartments and ion concentration waste compartments but flow serially within each compartment, the electrodeionization device comprising:

i.) a plurality of anode assemblies, each anode assembly includes a plurality of electrode plates;

ii.) a plurality of cathode assemblies, each cathode assembly includes a plurality of electrode plates; and

iii.) a plurality of channel groupings, wherein each channel grouping is paired with and interposed between a separate anode and cathode assembly, each channel grouping includes,

a) a plurality of ion depletion product compartments having an anode side and a cathode side, each of the ion depletion product compartments have attached on the anode side an anion permeable membrane, and attached on the cathode side a cation permeable membrane, and include a plurality of stacked serially arranged and linked fluid accessible ion depletion product channels divided into subchannels packed with ion-exchange resin beads, and ions are released from a fluid passing therethrough when a current is generated between the anode and cathode assemblies, each ion depletion product compartment configured such that a portion of a fluid stream flows into each ion depletion product channel sequentially, and another portion of the fluid stream bypasses the fluid accessible channels and flows to the next ion depletion product compartment by way of a first conduit bypassing the adjacent ion concentration waste compartment by flowing through a first bypass port, and

b) a plurality of ion concentration waste compartments having an anode side and a cathode side, each ion concentration waste compartment having attached on the anode side a cation permeable membrane, and attached on the cathode side an anion permeable membrane, wherein each ion concentration waste compartment alternates in sequence with each ion depletion product compartment, and each ion concentration waste compartment includes a plurality of stacked serially arranged and sequentially linked fluid accessible ion concentration waste channels divided into subchannels packed with ion-exchange resin beads,

wherein the average size of the resin beads in the ion concentration waste compartments being substantially smaller than the average size of resin beds in the ion depletion product compartments, and ions migrate into a fluid passing therethrough

when a current is generated between the anode and cathode assemblies, each ion concentration waste compartment configured such that a portion of a fluid stream flows into each of the ion concentration waste channel sequentially, and another portion of the fluid stream bypasses the water accessible waste channels and flows to the next ion concentration compartment by way of a second conduit, and bypassing the adjacent ion depletion compartment by flowing through a second ion bypass port,

wherein said first fluid flow path configured to introduce fluid into and release fluid from each said ion depletion product compartment substantially contemporaneously;

wherein said second fluid flow path configured to introduce fluid into and release fluid from each said ion concentration waste compartment substantially contemporaneously.

17. (Original) The electrodeionization device of claim 16, wherein the diameter of the resin beads is between about 0.033 and about 0.012 inch.

18. (Previously amended) The electrodeionization device of claim 16, wherein said anode assembly and said cathode assembly each comprises three electrode plates.

19. (Previously amended) The electrodeionization device of claim 1, wherein each ion depletion compartment and each ion concentration compartment contains ion exchange resin beads, the average size of the resin beads in the ion concentration compartments being substantially smaller than the average size of resin beds in the ion depletion compartments.

20. (Previously amended) An electrodeionization device through which is provided concurrent product and waste flow paths, wherein the product and waste flow paths flow contemporaneously in parallel between product and waste compartments but flow serially within each compartment, the electrodeionization device comprising:

i) a plurality of anode assemblies, each anode assembly includes a plurality of electrode plates;

ii) a plurality of cathode assemblies, each cathode assembly includes a plurality of electrode plates; and

iii) a plurality of channel groupings, wherein each channel grouping is paired with and interposed between a separate anode and cathode assembly, each channel grouping includes,

a) a plurality of ion depletion product compartments having an anode side and a cathode side, each ion depletion product compartment having attached on the anode side an anion permeable membrane, and attached on the cathode side a cation permeable membrane, and include a plurality of stacked serially arranged and sequentially linked fluid accessible ion depletion product channels divided into subchannels which contain therein ion exchange material wherein ions are released from a fluid passing therethrough when a current is generated between the anode and cathode assemblies, each ion depletion product compartment configured such that a portion of a fluid stream flows into each ion depletion product channel sequentially, and another portion of the fluid stream bypasses the fluid accessible ion depletion product channels and flows to the next ion depletion product compartment by way of a first conduit bypassing the adjacent ion concentration waste compartment by flowing through a first bypass port, and

b) a plurality of ion concentration waste compartments having an anode side and a cathode side, each ion concentration waste compartment has attached on the anode side a cation permeable membrane, and on the cathode side an anion permeable membrane, each ion concentration compartment alternates in sequence with each ion depletion product compartment, and each ion concentration waste compartment includes a plurality of stacked serially arranged and sequentially linked fluid accessible ion concentration waste channels divided into subchannels which contain therein ion exchange material wherein the migration of ions into a fluid passing therethrough when a current is generated between said anode and cathode assemblies, each ion concentration waste compartment configured such that a portion of a fluid

stream flows into each of the ion concentration waste channel sequentially, and another portion of the fluid stream bypasses the ~~water~~ **fluid** accessible ion concentration waste channels and flows to the next ion concentration waste compartment by way of a second conduit, bypassing the adjacent ion depletion product compartment by flowing through a second ion bypass port,

[[~~a~~)]] c) wherein a **first** portion of the ~~water~~ **fluid** stream enters the ~~water~~ **fluid** accessible channels having a plurality of serially linked ion depletion product channels, wherein ions are released from ~~water~~ **fluid** passing therethrough when a current is generated between the anode and cathode assemblies, and ~~water~~ **fluid** is released from each ion depletion product compartments by way of a product compartment outlet port, and flows towards the next ion depletion product compartment by way of a first conduit, bypassing the adjacent ion concentration waste compartment by flowing through a first product compartment bypass port, and

[[~~b~~)]] d) wherein [[a]] another portion of the ~~water~~ **fluid** stream bypasses the ~~water~~ **fluid** accessible channels and flows towards the next ion depletion product compartment by way of a second conduit, bypassing the adjacent ion concentration compartment by flowing through a second product compartment bypass port, said a waste stream flow path configured to introduce a ~~water~~ **fluid** stream to each of the ion concentration waste ~~compartments~~ compartments by way of a waste compartment inlet port wherein,

[[~~c~~)]] e) wherein a **first** portion of the ~~water~~ **fluid** stream enters the ~~water~~ **fluid** accessible channels having a plurality of serially linked ion concentration waste channels, wherein ions migrate from ~~water~~ **fluid** passing therethrough when a current is generated between said anode and cathode assemblies, and ~~water~~ **fluid** is released from each ion concentration waste compartment by way of an outlet port, and flows towards the next ion concentration waste compartment by way of a first conduit and bypasses the adjacent ion depletion product compartment by flowing through a first waste compartment bypass port, and

[[~~d~~)]] f) wherein [[a]] another portion of the ~~water~~ **fluid** stream bypasses the ~~water~~ **fluid** accessible channels and flows towards the next ion concentration waste

compartment by way of a second conduit, bypassing the adjacent ion depletion product compartment by flowing through a second waste compartment bypass port ~~each depletion compartment configured such that fluid brought thereinto flows into each ion concentration channel substantially sequentially,~~

~~wherein each depletion and concentration compartment comprises a substantially monolithic thermoplastic framework, said thermoplastic framework formed to define~~

~~(a) said channels of the respective compartment,~~

~~(b) a fluid inlet and a fluid outlet,~~

~~(c) a first and second fluid bypass capable of allowing the fluid to pass through said respective compartment without passing through said channels of said respective compartment~~.

21. (Currently Canceled)

22. (Previously presented) The electrodeionization device of claim 20, wherein each ion depletion compartment and each ion concentration compartment contains ion-exchange resin beads, the average size of the resin beads in the ion concentration compartments being substantially smaller than the average size of resin beds in the ion depletion compartments.

23. (Previously presented) The electrodeionization device of claim 20 wherein the number of anode plates, cathode plates, and ion depletion channels in each ion depletion compartment, and the number of ion concentration channels in each ion concentration compartment is the same.

24. (Previously presented) The electrodeionization device of claim 22, wherein the diameter of the resin beads is between about 0.033 and about 0.012 inches.